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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/783,893 | 02/20/2004 | Hiroyuki Seki | FUSA 20.984 (100807-00096) | 7636 |
| 26304 | 7590 | 05/14/2007 | EXAMINER | |
| KATTEN MUCHIN ROSENMAN LLP 575 MADISON AVENUE NEW YORK, NY 10022-2585 | | | TORRES, JUAN A | |
| | | | ART UNIT | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|-------------------------------|-----------------------------|--|
| Office Action Summary | Application No. 10/783,893 | Applicant(s) SEKI ET AL. | |
| | Examiner Juan A. Torres | Art Unit 2611 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6,9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-13 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The modifications to the drawings were received on 04/25/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 04/25/2007, the Examiner withdraws drawings objections of the previous Office action.

Specification

The modifications to the specification were received on 04/25/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 04/25/2007, the Examiner withdraws Specification objections of the previous Office action.

Claim Objections

The modifications to the claims were received on 04/25/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 04/05/2007, the Examiner withdraws claims objections to claim 4 of the previous Office action.

Response to Arguments

Regarding claim 1:

Applicant's arguments filed 04/25/2007 have been fully considered but they are not persuasive.

The Applicant contends, "Fattouche et al. only describe, however, one orthogonal code consisting of $c(1) \sim c(N)$ direct sequence spread spectrum code symbols being

assigned to a user. Please see col. 4, lines 15-16 of Fattouche et al. Thus, even assuming, arguendo, that it would have been obvious to one skilled in the art to combine Suzuki and Fattouche et al. at the time the claimed invention was made, such a combination would still have failed to disclose or suggest".

The Examiner disagrees, and asserts, that as indicated in the previous Office action, Fattouche (US 5555268 A) "discloses assigning M-number of orthogonal codes to a user (abstract, figure 1; column 2 lines 2-16 and lines 34-39; and column 4 lines 4-20)", in the abstract Fattouche discloses "In this patent, we present MultiCode Direct Sequence Spread Spectrum (MC-DSSS) which is a modulation scheme that assigns up to N DSSS codes to an individual user where N is the number of chips per DSSS code". This is also disclosed in WiLAN, (Spread Spectrum Wireless Technology, September 2000) discloses a multi-code DSSS CDMA, cited in the previous Office action, that specifically discloses "Multi-code Direct Sequence Spread Spectrum Multi-code Direct Sequence Spread Spectrum (MC-DSSS), Wi-LAN's patented technology (United States patent number 5,555,268) is a spectrally efficient spread spectrum modulation technique that assigns up to N DSSS codes to a single user where N is the number of chips per DSSS code. These N DSSS codes are all orthogonal. In other words, MC-DSSS enables multiple CDMA codes to be assigned to a single user in a CDMA network, thus increasing throughput. Conventional systems with a single user using three codes not only triple the throughput but also triple the cost of having three full transceivers. In MC-DSSS implementation, the information on all codes can be decoded in a single transformation. The implementation of MC-DSSS has the following

advantages: 1.It does not require the stringent synchronization DSSS requires: conventional DSSS systems required synchronization to within a fraction of a chip whereas MC-DSSS requires synchronization to within two chips; 2.It does not require the stringent carrier recovery DSSS requires: conventional DSSS requires the carrier at the receiver to be phase locked to the received signal whereas the MC-DSSS does not require phase locking the carriers. Commercially available crystals have sufficient stability for MC-DSSS; and 3. It is spectrally efficient" (see figure 1).

For these reasons, and the reason stated en the previous Office action, the rejection of claim 1 is maintained.

Regarding claims 9 and 3:

Applicant's arguments filed 04/25/2007 have been fully considered but they are not persuasive.

The Applicant contends, "Accordingly, Applicants respectfully submit that claim 1 is patentable over Suzuki and Fattouche et al., separately -and in combination, for at least the foregoing reasons. Claim 9 incorporates features that correspond to those of claim 1 cited above, and is, therefore patentable over the cited references for at least the same reasons. The Examiner relied upon Tanaka et al. as a combining reference to specifically address the additional features recited in dependent claim 3. As such, the addition off this reference would still have failed to cure the above-described deficiencies of Suzuki and Fattouche et al., even assuming, that such addition would have been obvious to one skilled in the art at the time the claimed invention was made.

Accordingly, Applicants respectfully submit that claim 3 is patentable over the cited references for at least the above-stated reasons".

The Examiner disagrees, and asserts, that because the rejection of claim 1 is maintained, the rejections of claims 9 and 3 are also maintained

For these reasons, and the reason stated en the previous Office action, the rejection of claims 9 and 3 are maintained.

Regarding claim 5:

Applicant's arguments with respect to claim 5 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Fattouche (US 5555268 A) (hereafter, referred as Fattouche) (using WiLAN, (Spread Spectrum Wireless Technology, September 2000) for inherency).

Regarding claim 1, Suzuki discloses assigning a plurality of different subcarriers to each user (abstract; figures 2, 3 and 5A-11; page 3 lines 31-33); performing multicarrier transmission of the transmit data of a user by the subcarriers assigned (abstract; figures 2, 3 and 5A-11; page 3 lines 14-17); and transmitting each of the results of addition by the subcarrier assigned (abstract; figures 2, 3 and 5A-11; column

3 lines 9-15). Suzuki doesn't disclose assigning M-number of orthogonal codes to a user; converting transmit data to parallel data comprising M-number of symbols by a serial-to-parallel conversion; multiplying an ith symbol of the parallel data individually by each code constituting ith orthogonal codes; adding corresponding results of multiplication from among the results of multiplication obtained for every symbol.

Fattouche discloses assigning M-number of orthogonal codes to a user (abstract, figure 1; column 2 lines 2-16 and lines 34-39; and column 4 lines 4-20. See also WiLAN, (Spread Spectrum Wireless Technology, September 2000) section "Multi-Code Direct Sequence Spread Spectrum" and figure 1 in page 2 for inherency); converting transmit data to parallel data comprising M-number of symbols by a serial-to-parallel conversion (abstract, figure 1 block 10; column 4 lines 4-20); multiplying an ith symbol of the parallel data individually by each code constituting ith orthogonal codes (abstract, figure 1 block 12; column 4 lines 4-20); adding corresponding results of multiplication from among the results of multiplication obtained for every symbol (abstract, figure 1 block 14; column 4 lines 4-20). Suzuki and Fattouche are analogous art because they are from the same field of endeavor of CDMA systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the Multi Code CDMA disclosed by Fattouche with the Multi carrier CDMA disclosed by Suzuki. The suggestion/motivation for doing so would have been to enhance the throughput (Fattouche column 1 lines 66-67).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki and Fattouche as applied to claim 1 above, and further in view of Tanaka (US 6347220

B1) (hereafter, referred as Tanaka) (this is also Applicant Admitted Prior Art in figures 22 and 23 page 8 line32 to page 10 line 21 of the specification).

Regarding claim 3, Suzuki and Fattouche disclose claim 1, Suzuki also discloses assigning a plurality of subcarriers exclusively to each user (abstract; figures 2, 3 and 5A-11; column 3 lines 41-47); and transmitting transmit data to each user by the subcarriers assigned (abstract; figures 2, 3 and 5A-11; column 3 lines 9-15). Suzuki and Fattouche don't disclose applying beam-forming processing user by user. Tanaka discloses applying beam-forming processing user by user (abstract, figures 10 and 11 column 1 lines 26-45). Suzuki, Fattouche and Tanaka are analogous art because they are from the same field of endeavor of CDMA systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the CDMA multiple beam antenna disclosed by Tanaka with the Multi carrier CDMA disclosed by Suzuki and Fattouche. The suggestion/motivation for doing so would have been to reduce interference between channels, improve reception SN ratio owing to a higher antenna gain and a reduce terminal transmission power (Tanaka column 1 lines 40-46).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereafter, referred as AAPA) in view of Fattouche (US 5555268 A) (hereafter, referred as Fattouche) (using WiLAN, (Spread Spectrum Wireless Technology, September 2000) for inherency).

Regarding claim 5, AAPA discloses assigning the same subcarriers to a plurality of users and assigning different orthogonal codes to each user (figure 16, 20 and 21 page 8 lines 1-31); and transmitting the transmit data of each user by performing code

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multiplexing on the same subcarriers (figure 16 block 15 page 5 lines 12-34). AAPA doesn't disclose assigning plural different orthogonal codes to each user, and using said plural different orthogonal code. Fattouche discloses assigning plural different orthogonal codes to each user, and using said plural different orthogonal code (abstract, figure 1; column 2 lines 2-16 and lines 34-39; and column 4 lines 4-20. See also WiLAN, (Spread Spectrum Wireless Technology, September 2000) section "Multi-Code Direct Sequence Spread Spectrum" and figure 1 in page 2 for inherency). Suzuki and Fattouche are analogous art because they are from the same field of endeavor of CDMA systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the Multi Code CDMA disclosed by Fattouche with the Multi carrier CDMA disclosed by Suzuki. The suggestion/motivation for doing so would have been to enhance the throughput (Fattouche column 1 lines 66-67).

Regarding claim 6, AAPA and Fattouche disclose claim 5, AAPA also discloses applying identical transmit beam-forming processing to the transmit data of said plurality of users to which the same subcarriers have been assigned (figure 23 page 10 lines 1-17).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fattouche (US 5555268 A) (using WiLAN, (Spread Spectrum Wireless Technology, September 2000) for inherency) in view of Suzuki (EP0786890 A2).

Regarding claim 9, Fattouche discloses means for assigning M-number of orthogonal codes to a user (abstract, figure 1; column 2 lines 2-16 and lines 34-39; and column 4 lines 4-20. See also WiLAN, (Spread Spectrum Wireless Technology,

September 2000) section "Multi-Code Direct Sequence Spread Spectrum" and figure 1 in page 2 for inherency); a serial/parallel converter for converting the transmit data to parallel data comprising M-number of symbols by a serial-to-parallel conversion (abstract, figure 1 block 10; column 4 lines 4-20); a multiplier for multiplying an ith symbol of the parallel data, individually by each code constituting ith orthogonal codes in said M-number orthogonal codes where $i=1, 2, \dots, M$ (abstract, figure 1 block 12; column 4 lines 4-20. See also WiLAN, (Spread Spectrum Wireless Technology, September 2000) section "Multi-Code Direct Sequence Spread Spectrum" and figure 1 in page 2 for inherency); a combiner for combining results of multiplication by corresponding codes of each of the orthogonal codes (abstract, figure 1 block 14; column 4 lines 4-20). Fattouche doesn't disclose a transmitting unit for performing multicarrier transmission of each of the combined results by a plurality of subcarriers that have been assigned to the user. Suzuki discloses a transmitting unit for performing multicarrier transmission of each of the combined results by a plurality of subcarriers that have been assigned to the user (abstract; figures 2, 3 and 5A-11; page 3 lines 14-33). Fattouche and Suzuki are analogous art because they are from the same field of endeavor of CDMA systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the Multi Code CDMA disclosed by Fattouche the Multi carrier CDMA disclosed by Suzuki. The suggestion/motivation for doing so would have been to prevent deterioration of the S/N ration (Suzuki page 2 lines 40-43)

Allowable Subject Matter

Claims 11-13 allowed.

The following is a statement of reasons for the indication of allowable subject matter: Claims 11-13 are allowed because the references cited fail to teach, as applicant has, a transmitting apparatus of a base station in a multicarrier CDMA transmission system for multiplying user data individually by each code constituting orthogonal codes and transmitting each result of multiplication by a prescribed subcarrier, comprising an array antenna comprising a plurality of antenna elements, a beamforming unit for applying beam-forming processing to transmit data of a user and generating transmit data for each antenna element, a multiplier, which is provided for every antenna element, for multiplying one symbol of transmit data, to which the beam-forming processing has been applied, individually by each code constituting orthogonal codes that have been assigned to a user, and a transmitting unit, which is provided for every antenna element, for performing multicarrier transmission of results of multiplication by a plurality of subcarriers that have been assigned on a per-user basis; and a transmitting apparatus of a base station in a multicarrier CDMA transmission system for multiplying user data individually by each code constituting orthogonal codes, outputting results of multiplication and transmitting each result of multiplication by a prescribed subcarrier, comprising an array antenna comprising a plurality of antenna elements, a beamforming unit for applying beam-forming processing to transmit data of a user and generating transmit data for each antenna element, a serial/parallel converter, which is provided for every antenna element, for

converting transmit data, to which the beam-forming processing has been applied, to parallel data; a multiplier, which is provided for every antenna element, for multiplying one symbol of parallel data, which has been obtained by the serial-to-parallel conversion, separately by each code constituting orthogonal codes that have been assigned to a user and similarly multiplying each symbol of the parallel data individually by each code constituting other orthogonal codes that have been assigned to said user, a combiner, which is provided for every antenna element, for combining results of multiplication by corresponding codes of each of the orthogonal codes, and a transmitting unit, which is provided for every antenna element, for performing multicarrier transmission of each of the combined results by a plurality of subcarriers that have been assigned on a per-user basis, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is 571-272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres
05-01-2007

TEMESGHEN GHEBRETINSAE
PRIMARY EXAMINER
5/8/07
JK